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CH2MHILL

DOCKET	
09-AFC-10	
DATE	APR 12 2010
RECD.	APR 12 2010

April 12, 2010

Mr. John Kessler
Siting Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Subject: Rice Solar Energy Project (09-AFC-10)
Response to CEC Workshop Queries 4, 6-8, and 11

Dear Mr. Kessler:

Attached please find one hardcopy and one CD of Rice Solar Energy, LLC's responses to California Energy Commission Staff Workshop Queries 4, 6-8, and 11 for the Application for Certification for the Rice Solar Energy Project (09-AFC-10). Workshop Queries 6 and 7 will be filed separately under a request for confidentiality.

If you have any questions about this matter, please contact me at (916) 286-0278 or Sarah Madams at (916) 286-0249.

Sincerely,

CH2M HILL

Douglas M. Davy, Ph.D.
AFC Project Manager

cc: POS List
Project File

Supplemental Filing

Responses to CEC Staff Workshop Queries 4, 6-8 and 11

In support of the

Application for Certification

for the

Rice Solar Energy Project

(09-AFC-10)

Submitted to the:

California Energy Commission

Submitted by:

SOLARRESERVE

With Technical Assistance by:

CH2MHILL

Sacramento, California

April 2010

Contents

Figures

Attachments

Introduction

Attached are Rice Solar Energy, LLC's (RSE's) responses to California Energy Commission (CEC) Staff Workshop Queries 4, 6-8, and 11, submitted in support of RSE's Application for Certification (AFC) for the Rice Solar Energy Project (RSEP) (09-AFC-10). The Workshop Queries are informal requests for additional information that Staff raised during the Data Request Response and Issue Resolution Workshop that was held on March 19, 2010 and for which the RSE has agreed to provide a response or additional information to assist Staff in preparing their environmental and engineering assessment of the RSEP.

Biological Resources

Operations Phase Fenceline

WSQ 4 Please provide an illustration that shows the fenced area during the operations phase of the project, at the north end of the heliostat field (as opposed to the fenced area during construction).

Response: During construction, the fenced area at the north end of the heliostat field will include the administration and shop building, heliostat assembly building, worker parking, worker residence (trailer park), and construction laydown areas. Once construction has been completed, this fenced area will shrink by approximately 94 acres. The total fenced area including the heliostat field will be reduced from 1,504 to 1,410 acres. The fenced area during operations will contain only a fenced access roadway connecting the heliostat field with State Route 62, the administration/shop building, and the heliostat assembly building. The construction laydown and worker parking areas will no longer be used and will be outside of the permanent fence. This is illustrated in Figure WSQ4-1.

LEGEND

- CHAIN LINK FENCING
- PROPERTY BOUNDARY
- ROAD EASEMENT
- EXISTING ARIZONA-CALIFORNIA RAILWAY
- CA STATE ROUTE 62
- TEMPORARY FENCING

OFF-SITE TEMP LAYDOWN / CONST. AREA & CONSTRUCTION TRAILERS

MAIN ENTRANCE

SECONDARY ACCESS NOT PAVED

OFF-SITE CONSTRUCTION PARKING (AS REQUIRED SEE NOTE)

CONSTRUCTION CREWS TRAILER PARKING

Operations Phase Permanent Fenceline

ADMIN / SHOP

TEMP HELIOSTAT ASSEMBLY BLDG / AREA

HELIOSTAT FIELD

N

0 400 800 1200 1600

1" = 400 FT

NOTE:

THE PARKING AND LAYDOWN AREAS SHOWN ARE LABELED "OFF-SITE" BECASUE THEY ARE LOCATED OUTSIDE THE PERMANENT FENCE LINE AND THE PERMANENT FACILITIES. ADDITIONAL PARKING AND LAYDOWN WILL BE USED WITHIN THE HELIOSTAT FIELD AND POWER BLOCK AREA, BUT ARE NOT SHOWN.

PRELIMINARY
NOT FOR CONSTRUCTION

FIGURE WSQ4-1
OPERATIONS PHASE
PERMANENT FENCELINE
Rice Solar Energy Project
Riverside County, California

Source: WorleyParsons, Ltd., Drawing SRRC-0-SK-112-111-002, Rev. E, 08/24/2009.

Cultural Resources

Rice Army Airfield and Camp Rice Archaeological Features Map

WSQ 6 Please provide an illustration that shows all of the archaeological features recorded at Rice Army Airfield and Camp Rice on a single sheet. Use an oversize sheet if necessary.

Response: Figure WSQ6-1 is a map that shows the locations of all of the archaeological features recorded at Rice Army Airfield and portions of Camp Rice during archaeological field surveys for the Rice Solar Energy Project. This figure is printed on an oversize sheet and is being submitted separately under a request for confidentiality.

Rice Army Airfield and Camp Rice Archaeological Features Photographs

WSQ 7 Please provide feature record forms or photographs of the archaeological features recorded at Rice Army Airfield and Camp Rice.

Response: Attachment WSQ7-1 is a CD-ROM containing photographs of each of the archaeological features recorded at Rice Army Airfield and Camp Rice during archaeological surveys for the Rice Solar Energy Project. Photograph filenames are keyed to the site (Rice Army Airfield or Camp Rice) and feature number. Also included are photograph logs indicating the date, time, subject, and direction of each photograph. The photographs are being submitted separately under a request for confidentiality.

Attachment WSQ6-1

Figure WSQ6-1, Archaeological Features at Rice Army Airfield and Camp Rice

Note: Maps showing the locations of archaeological deposits are considered confidential and not for public distribution and are being submitted separately under a request for confidentiality.

Attachment WSQ7-1

Photographs of Archaeological Features

Note: Photographs of archaeological deposits are considered confidential and not for public distribution and are being submitted separately under a request for confidentiality.

Soil and Water Resources

Septic System Design

WSQ 8 Please provide additional information on the design of the septic system.

Response: Attachment WSQ8-1 is a technical memorandum that provides more detailed design information regarding the septic system.

Groundwater Monitoring

WSQ 11 Please provide additional information plans for groundwater monitoring..

Response: Attachment WSQ11-1 is a draft groundwater monitoring plan.

Attachment WSQ8-1

Septic System Design Memorandum

RICE SOLAR ENERGY PROJECT

CONCEPTUAL SEPTIC SYSTEM DESIGN AND LAYOUT

Submitted to:

California Energy Commission

Submitted by:

Rice Solar Energy, LLC

With technical assistance from:

WorleyParsons Group, Inc.

April 2010

Prepared By:

04/01/2010

_____

Janine Forrest Date

Reviewed By:

Bob Anders, California Registered Professional Engineer, as an employee of WorleyParsons, with expertise in civil engineering, has reviewed the report with the title “Rice Solar Energy Project ~ Conceptual Septic System Design and Layout”. His signature and stamp appear below.

04/01/2010

_____

Bob Anders, PE Date

NOTICE

The information presented in this document was compiled and interpreted exclusively for the purposes stated in the document introduction. WorleyParsons provided this report for Rice Solar Energy, LLC solely for the purpose noted above.

WorleyParsons has exercised reasonable skill, care, and diligence to assess the information acquired during the preparation of this report, but makes no guarantees or warranties as to the accuracy or completeness of this information. The information contained in this report is based upon, and limited by, the circumstances and conditions acknowledged herein, and upon information available at the time of its preparation. The information provided by others is believed to be accurate but cannot be guaranteed.

WorleyParsons does not accept any responsibility for the use of this report for any purpose other than that stated in the document introduction and does not accept responsibility to any third party for the use in whole or in part of the contents of this report. Any alternative use, including that by a third party, or any reliance on, or decisions based on this document, is the responsibility of the alternative user or third party.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ATTACHMENTS

1. INTRODUCTION

This report presents a conceptual septic system design and layout for the proposed Rice Solar Energy Project (herein "RSEP" or "Project"), located 3 miles east of the town Rice, in eastern Riverside County, California (refer **Figure 1**). Rice Solar, LLC, is proposing to construct, own and operate the RSEP on an approximate 1,410-acre site, located south of California State Route 62 and north of Rice Valley. The RSEP is a 150-megawatt (MW) solar thermal power generating project with integral thermal storage, a central receiver tower, and a tracking heliostat field

Rice Solar LLC proposes to use two septic systems; Septic System A is for the workshop and the administration building and Septic System B is for the control and operations building. This document presents a conceptual design for these two systems. Field work is required to verify the suitability of the location and length of the disposal leach lines. The objective and purpose of this Conceptual Septic System Design and Layout is to provide sufficient information to the California Energy Commission (CEC) to aid in permitting of the Project, and to aid in future detailed design of the septic system. This report is based on estimated "fixture units" within the buildings served by septic systems, and shows that the systems can be designed to meet the needs of the facility and comply with all laws, ordinances, regulations and standards (LORS). During detailed design there are numerous factors that will require adjustments to the design. These include changes to the number of estimated fixture units and the actual infiltration rates recorded at the leach field locations. The adjustments made during final design may include relocation of the septic system facilities, additional sizing of the leach fields, and additional sand/gravel areas to promote infiltration. Although changes are expected during final design, the changes can be made to meet the final needs of the system while complying with all applicable LORS.

2. SITE DESCRIPTION

2.1 LOCATION

The RSEP site will be located in an unincorporated area of eastern Riverside County, California, situated immediately south of State Route (SR) 62 at milepost 109 (refer **Figure 2**). The RSEP site is located in a very sparsely settled portion of the Colorado Desert, a subregion of the Sonoran Desert. The nearest residence and permanent settlement to the RSEP is Vidal Junction which is 14.8 miles east-northeast (15.4 miles by road) at the junction of SR 62 and US Route 95. There is no available public sewage system, and therefore a standalone septic system is required.

2.2 TOPOGRAPHY

The RSEP area is within the Colorado Desert in an area characterized by basin and range geomorphology. The RSEP site is located at approximately 750 to 920 feet above mean sea level (amsl), creating a less than 2 percent fall across the Project site from north to south.

2.3 FLOODPLAIN

The RSEP site is located within the Rice Valley and has a very slight slope (less than 2 percent overall). As runoff occurs primarily during thunderstorms, there are no perennial streams in the planning area and most of the moisture from rain is lost through evapotranspiration. Therefore the septic system will not be located near any surface waters.

2.4 GEOLOGY

The Rice Valley area is in the Sonoran Desert / Mojave Desert physiographic province of California. The Sonoran Desert / Mojave Desert region is dominated by broad alluviated basins and the local area is underlain by a thick series of alluvial sediments derived from the surrounding highlands. Drilling at the site indicates it is underlain by Quaternary Alluvium (Qal) that is comprised of sand, silt, clay and gravel to a depth of about 810 feet below ground surface (bgs). A recent geotechnical investigation has shown that near-surface soils at the RSEP site consists of dense silty sands and poorly graded sands interpreted from onsite drilled borings. Boring depths ranged from approximately 10 to 85 feet below ground surface (bgs) (Terracon 2009).

2.5 HYDROGEOLOGY

The RSEP site is located in the north central portion of the Rice Valley Groundwater Basin, a desert basin with relatively limited groundwater recharge and little existing groundwater use. Groundwater levels were reported at a depth of approximately 285 feet bgs, based on water levels measured in on site wells (WorleyParsons 2009).

2.6 EXISTING STRUCTURES AND SEWAGE SYSTEM

During World War II, the RSEP site was part of the Desert Training Center (DTC) complex (also known as the California-Arizona Maneuver Area or CAMA) of airfields and military training camps and used as a training airfield, Rice Army Airfield, between 1942 and early 1944. The airfield was closed by the military in August 1944, but used privately during the 1950s, and then abandoned sometime before 1958. The general landscape in the vicinity of the RSEP site now consists of a gently sloping alluvial fan, covered in creosote bush scrub.

In February 1999, one 5,000 gallon steel UST and three concrete septic tanks (one 350 gallon and two 500 gallon) were reportedly found on site and removed. According to a report prepared by Ecology Control Industries (ECI), the septic tanks had been used for fuel storage in the past.

2.7 FUTURE CONDITIONS

The Project site will be developed and contain infrastructure to facilitate 150 MW of power generation (refer to **Figure 2**). There will be several buildings on the RSEP site to cater for the administration and operational requirements. The operational (control) buildings will be located within the power block and the administration building will be located outside the heliostat field. Both of these buildings require connection to a new septic system.

Raw process water will be supplied from two onsite groundwater wells, and will be treated and used for steam-cycle makeup, heliostat washing, boiler blowdown and other domestic needs.

Groundwater wells are planned to be located to the southeast of the receiver tower, near the raw water storage tank. This location is southwest from the receiver tower and will allow a minimum distance of 300 feet from the septic system. A package potable water treatment system will be used to treat well water to meet potable standards.

3. REGULATORY REQUIREMENTS

The County of Riverside, Department of Environmental Health (RDEH) has jurisdiction over the design and installation of onsite wastewater treatment systems (OWTS) in Riverside County. A more detailed feasibility study will need to be provided to the RDEH for written approval of the system prior to construction (Riverside County Version A). The feasibility study will contain a detailed description of the property, site plan, results from percolation tests, and preliminary recommendations of the percolation rate, location and design of disposal system. As this report is conceptual, the RDEH design requirements will be discussed in **Section 4**, and field verification is required before commencement of detailed design.

Under the CRBRWQCB *Guidelines for sewage disposal from land developments*, this project will be exempt from filing a Report of Waste Discharge due to the size of the system (less than 5,000 gpd domestic sewage on any single day, from a proposed commercial or industrial source) (CRBRWQCB undated). In addition, the depth of soil between ground surface and high groundwater level is greater than 10 feet (approximately 285 feet), the minimum depth criteria to prevent violation of water quality objections, to prevent impairment of present or future beneficial uses of water, prevent pollution, nuisance, or contamination and to prevent unreasonable degradation of the quality of any waters of the state (CRBRWQCB undated).

4. CONCEPTUAL SEPTIC SYSTEM

The major components of the conceptual septic system process (for each of the control and administration buildings) are:

i. Influent conveyance piping;

ii. Primary Septic Tanks;

iii. Distribution Box; and

iv. Disposal Fields.

The purpose of each component and preliminary sizing is provided in the following sections.

4.1 INFLUENT CONVEYANCE PIPING

Influent conveyance piping transfers wastewater from the pluming inside the buildings, to the downstream primary septic tanks. Conveyance piping shall be Schedule 40 PVC and sized in accordance with the maximum unit loading and maximum length of drainage piping indicated in Tables 7-5 of the California Uniform Plumbing Code (CUPC).

Attachment 1 provides the estimation of plumbing fixtures to be connected to each septic system, and their applicable unit loading under the CUPC (based on Table 7-3). In Septic System A, the workshop has an estimated 14 fixture units and the administration building has an estimated 52 fixture units. In Septic System B, the control and operations building has an estimated 52 fixture units. Based on Table 7-5, the influence pipe from the workshop shall have a 3" diameter and the influent conveyance pipe from the administration building and control and operations building shall have a 4" diameter. For 3-inch diameter drain pipe, the minimum slope shall be 2%. For 4-inch and larger diameter drain pipe, the minimum slope shall be 1%. Under the CUPC, cleanouts are to be provided for each 100 feet of pipe length, at changes in direction or at key system access locations. All piping shall be air- or water-tested pursuant to Sections 712.2 and/or 712.3 of the CUPC.

4.2 PRIMARY SEPTIC TANKS

In the primary septic tanks, the raw sewage separates into three distinct zones: a scum layer, a sludge layer, and a clear layer (refer **Figure 5**). Heavy solids settle to the bottom to form the sludge layer, while the lighter material floats to the top to create the scum layer. Facultative and anaerobic digestion converts the organic matter to volatile organic acids while anaerobic processes ferment the volatile organic acids to gases (methane, carbon dioxide, etc.).

Effluent from the clear zone of the primary septic tanks will be pumped through an effluent filter before discharging into the distribution box. The Riverside County Ordinance No. 650.5 Regulating the Discharge of Sewage in the Unincorporated Areas requires new OWTS to "*prevent solids in excess of one-eighth (1/8) inch in diameter from passing to the dispersal system while under two feet of hydrostatic head. Septic tanks that use National Sanitation Foundation (NSF)/ American National Standards Institute (ANSI) Standard 46 certified septic tank filters at the final point of effluent discharge from the OWTS and prior to the dispersal system shall be deemed to meet this requirement."* Therefore this standard will be used when determining the manufacturer of the septic tank and effluent filter.

As per the RDEH design guidelines, the tank shall be equipped with at least 2 access risers (minimum 20 inch diameter), one on the solid side and the other on the effluent side which shall extend to within 4 inches of final grade. The risers shall be sealed off with an approved lid (locked or equivalent) and be accessible from the ground surface. All tanks must meet minimum structural requirements, be completely watertight, and pass a watertight integrity test (including the riser / tank connection). The minimum excavation depth of the septic tank will be determined by what depth is required to obtain gravity flow and meet minimum slope criteria of the influent conveyance pipes connected to the building sewer pipes.

The liquid capacity of the septic tanks shall conform to either Table K-2 or K-3 in the CUPC (which ever is greater) (refer to **Attachment 1** for septic tank calculations).

CUPC Table K-2 assesses minimum septic tank capacity based on the number of bedrooms or maximum fixture units. As shown in **Attachment 1**, Septic System A has a total estimated fixture unit of 66 which equates to a 2,750 gallon septic tank as per CUPC Table K-2. Septic System B has a total estimated fixture unit of 52 which equates to a 2,250 gallon septic tank as per CUPC Table K-2.

CUPC Table K-3 assesses minimum septic tank capacity based on the estimated waste/sewage flow rates. For this conceptual assessment, the buildings have been considered *"offices"*, which equates to an estimated flow rate of 20 gallons per day per employee. It has been estimated that there will be 26 people in the Septic System A buildings and 21 people in the Septic System B buildings (refer **Attachment 1**). Therefore Septic System A would have a wastewater flow rate of 520 gallons per day and Septic System B would have a wastewater flow rate of 420 gallons per day. Under CUPC Table K-3, the recommended design criteria for septic tanks, for flows up to 1,500 gallons per day, is calculated as follows:

Septic Tank Size = Flow x 1.5

Based on this equation, the required septic tank size for Septic System A is 780 gallons and 630 gallons for Septic System B.

The septic tank size is larger for both systems using the methodology in CUPC K-2, and therefore the septic tanks for Septic System A shall be a minimum of 2,750 gallons and a minimum of 2,250 gallons for Septic System B.

The CUPC and RDEH documentation also note that the septic tanks size shall be limited by the soil structure classification as specified in Table K-5 of the CUPC. As no field work has been undertaken to date to determine the percolation rate of the soil structure, CUPC Table K-4 has been used to assess this design criteria. As discussed in **Section 2.4**, dense silty sands and poorly graded sands have been observed in the near surface boring investigations. This is a mixture of three categories in CUPC Table K-4; Coarse sand / gravel, fine sand and sandy loam / sandy clay. The infiltration rate of the sandy loam / sandy clay is most conservative, requiring a leaching area of 40 feet per 100 gallons, which is equivalent to a maximum allowable septic tanks size of 5,000 gallons in CUPC Table K-5. The minimum size selected septic tanks for Septic System A and B are both less than 5,000 gallons, therefore their sizes are acceptable under CUPC.

4.3 DISTRIBUTION BOX

The distribution box receives effluent from the septic tanks and distributes the wastewater evenly to the disposal fields under gravity (refer **Figure 5**). The distribution box is normally constructed of concrete, located under the ground and water tight, with a riser height suitable to be accessible at ground surface. The excavation depth of the distribution box will be determined on what is required to obtain gravity flow from the septic tank at a minimum pipe slope of 1%.

It is critical that the distribution box is installed on a flat surface to allow even distribution to all the disposal fields. If the distribution box is tipped, then effluent may be routed to only a portion of the disposal field, which could lead to line failure due to overloading and saturation of the soils. Devices can be installed into the outlet openings to regulate the distribution of flow if the distribution box is noted as uneven during operational inspections.

4.4 DISPOSAL FIELDS

Generally, the minimum required square foot of leaching area shall be based on the calculated septic tank capacity and/or estimated waste/sewage flow (which ever is greater) and conform to

Table K-4 (CUPC Section K-3). As discussed in **Section 4.2,** CUPC Table K-4 contains a range of soil types applicable to this project site. The most conservative applicable soil type was sandy loam / sandy clay which requires a minimum 40 square feet of leaching area per 100 gallons. The most conservative design of the leach fields will assume one square foot of leaching area is required per gallon of septic tank capacity. Therefore Septic System A will require 2,750 square feet of leaching area, and Septic System B will require 2,250 square feet of leaching area. The calculations to determine the length and depth of the systems are provided in **Attachment 2.**

Under CUPC and the RDEH guidelines, no excavation for leach line shall extend within 5 feet of the water table and there should be 8 feet of soil between the base of the leach field and impermeable strata. As discussed in **Section 2.4** and **2.5,** depth to groundwater is approximately 285 feet bgs and bedrock is at least 810 feet bgs. Therefore there are no leach field depth restrictions for the disposal field.

Based on a leach field width of 3 feet, the maximum allowable 3 foot depth of rock below the perforated pipe in the leach field, the leach field lengths are required (refer **Figure 5**):

- Septic System A ~ 392.9 feet (*equivalent to 4 x 99 foot lines, spaced 8 feet apart)*
- Septic System B ~ 321.4 feet (*equivalent to 4 x 81 foot lines, spaced 8 feet apart)*

The location of leach fields is determined by percolation tests, as the leach fields must have a percolation rate faster than 60 minutes per inch. For the purposes of this conceptual report, the location of Septic System A and B will be determined by the location of the buildings producing the effluent (refer **Figure 3** and **4**). This location will require field verification, using a percolation test, prior to detailed design and submission of information to the RDEH for approval.

In addition, there are minimum setback requirements between sewage disposal components. As outlined in CUPC Table K-1, the minimum horizontal distance the disposal field to a building/structure is 8 feet, 5 feet from a property line, 100 feet from a water supply well, 100 feet from a stream, 5 feet from a distribution box and 8 feet between disposal lines. In addition, then County of Riverside has a requirement that any surface sewage disposal system discharging 2,000 gal/day or more must be a minimum of 200 feet from a water well (Section 15 of the Riverside County Ordinance No. 682 Regulating the Construction, Reconstruction, Abandonment and Destruction of Wells). These distances have all been taken into consideration to determine the layout of the disposal field systems (refer **Figure 3 and 4)**. In addition, the leach fields are aligned across the slope rather than perpendicular, to allow for the minimum 15 foot set back from daylighting (refer **Figure 3**, **4 and 5**).

In addition, all OWTS require an area designated that could be used for 100% expansion of the original system. An expansion area has been allocated on **Figure 3 and 4**, however this area would also require percolation testing to determine if the rate is acceptable for locating the 100% expansion disposal field.

5. CLOSURE

This report contains a conceptual design of the two septic systems required at the RSEP. Site work will be required prior to commencement of detailed design to determine the suitability of the conceptual septic system locations.

6. REFERENCES

Colorado Regional Water Quality Control Board – Colorado River Basin Region (CRWQCB), Guidelines for Sewage Disposal for Land Developments, undated. http://www.waterboards.ca.gov/coloradoriver/publications_forms/publications/index.shtml (02/18/10).

Riverside County Department of Environmental Health, Onsite Wastewater Treatment Systems – Technical Guidance Manual, Version A

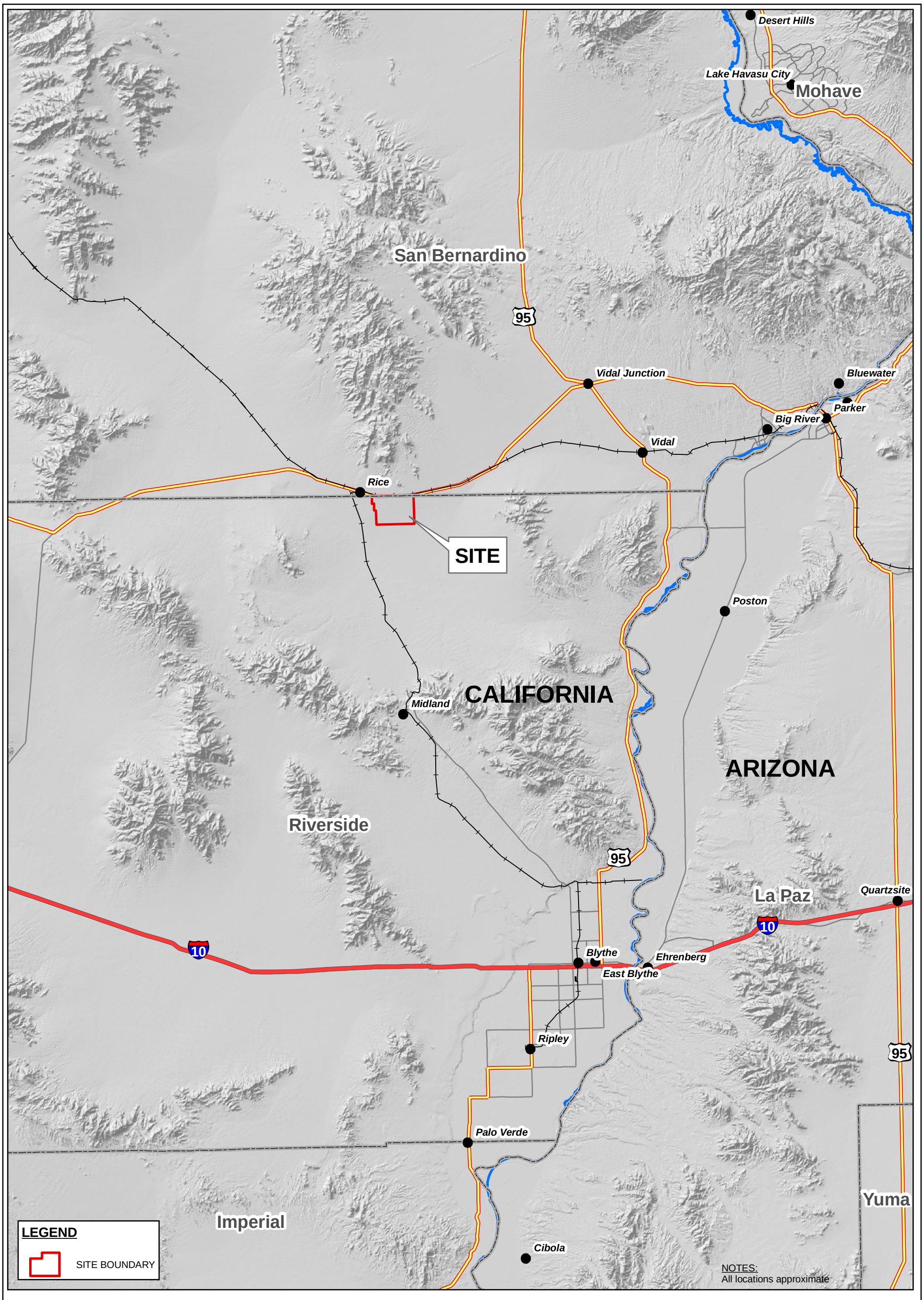
Riverside County (2006), Ordinance No 650.5, Regulating the Discharge of Sewage in the Unincorporated Areas of the County of Riverside

Riverside County (2007), Ordinance No 682, Regulating the Construction, Reconstruction, Abandonment and Destruction of Wells

Terracon (2009), Preliminary Geotechnical Engineering Report - Proposed 10MW Solar Energy Project. Former Rice Airfield, Rice CA, Prepared for SolarResource, July

Worley Parsons (2009), Groundwater Resources Investigation, Rice Solar Power Plant Project, Dated September 16.

FIGURES



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RICE SOLAR ENERGY, LLC

WorleyParsons
resources & energy

PROJECT LOCATION

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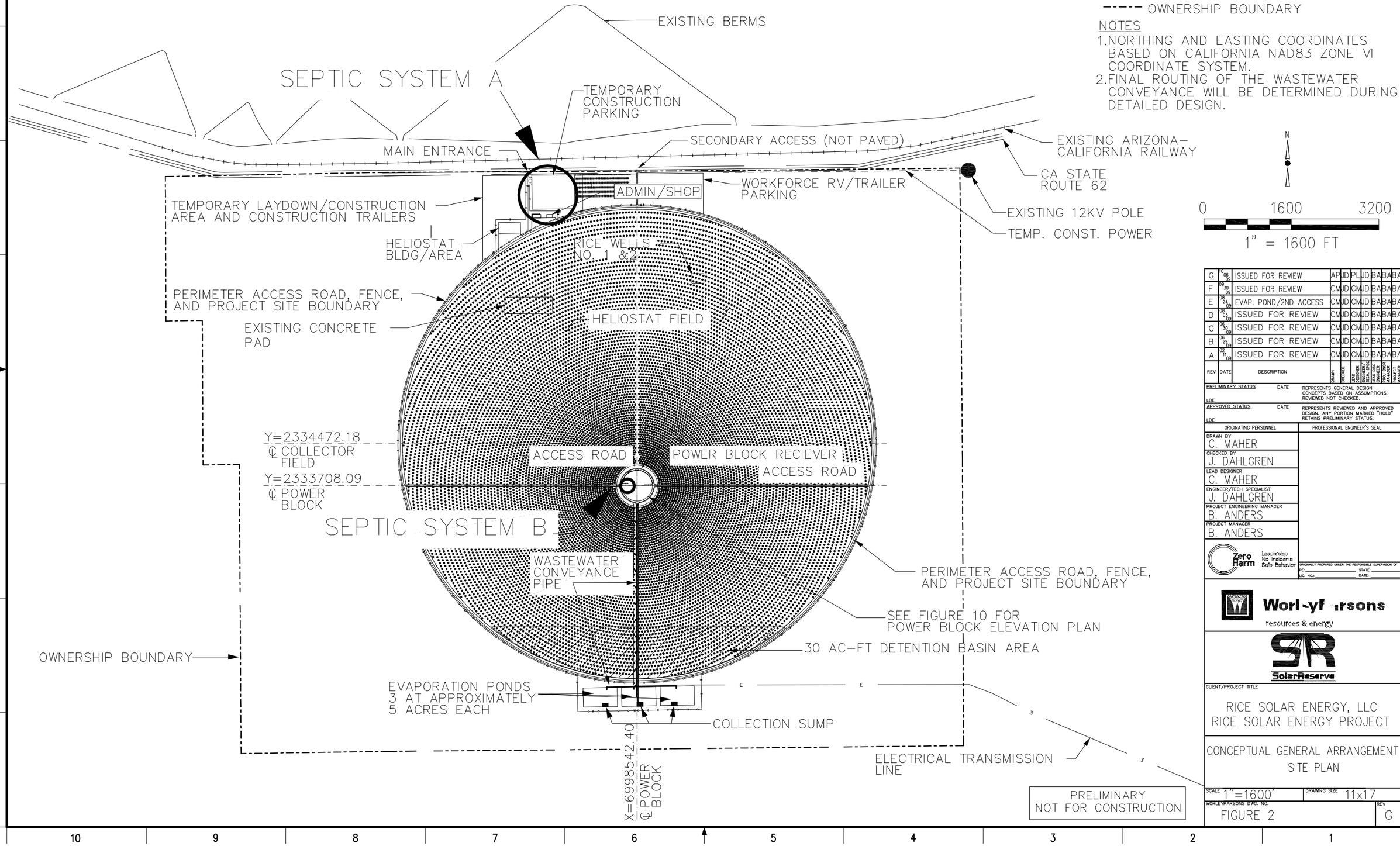


REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGR./TECH SPEC.	LEAD RISC ENGINEER	PROJ ENGR MANAGER	PROJECT MANAGER
G	10 06 09	ISSUED FOR REVIEW	AP	JD	PL	JD	BA	BA	BA
F	09 30 09	ISSUED FOR REVIEW	CM	JD	CM	JD	BA	BA	BA
E	09 24 09	EVAP. POND/2ND ACCESS	CM	JD	CM	JD	BA	BA	BA
D	09 03 09	ISSUED FOR REVIEW	CM	JD	CM	JD	BA	BA	BA
C	08 30 09	ISSUED FOR REVIEW	CM	JD	CM	JD	BA	BA	BA
B	08 28 09	ISSUED FOR REVIEW	CM	JD	CM	JD	BA	BA	BA
A	02 11 09	ISSUED FOR REVIEW	CM	JD	CM	JD	BA	BA	BA

PRELIMINARY STATUS — DATE — LDE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.

APPROVED STATUS — DATE — LDE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.

ORIGINATING PERSONNEL	PROFESSIONAL ENGINEER'S SEAL
DRAWN BY: C. MAHER	
CHECKED BY: J. DAHLGREN	
LEAD DESIGNER: C. MAHER	
ENGINEER/TECH SPECIALIST: J. DAHLGREN	
PROJECT ENGINEERING MANAGER: B. ANDERS	
PROJECT MANAGER: B. ANDERS	

Zero Harm — Leadership, No Incidents, Safe Behavior

ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF PE: _____ STATE: _____ LIC. NO.: _____ DATE: _____

Worley Parsons — resources & energy

SolarReserve

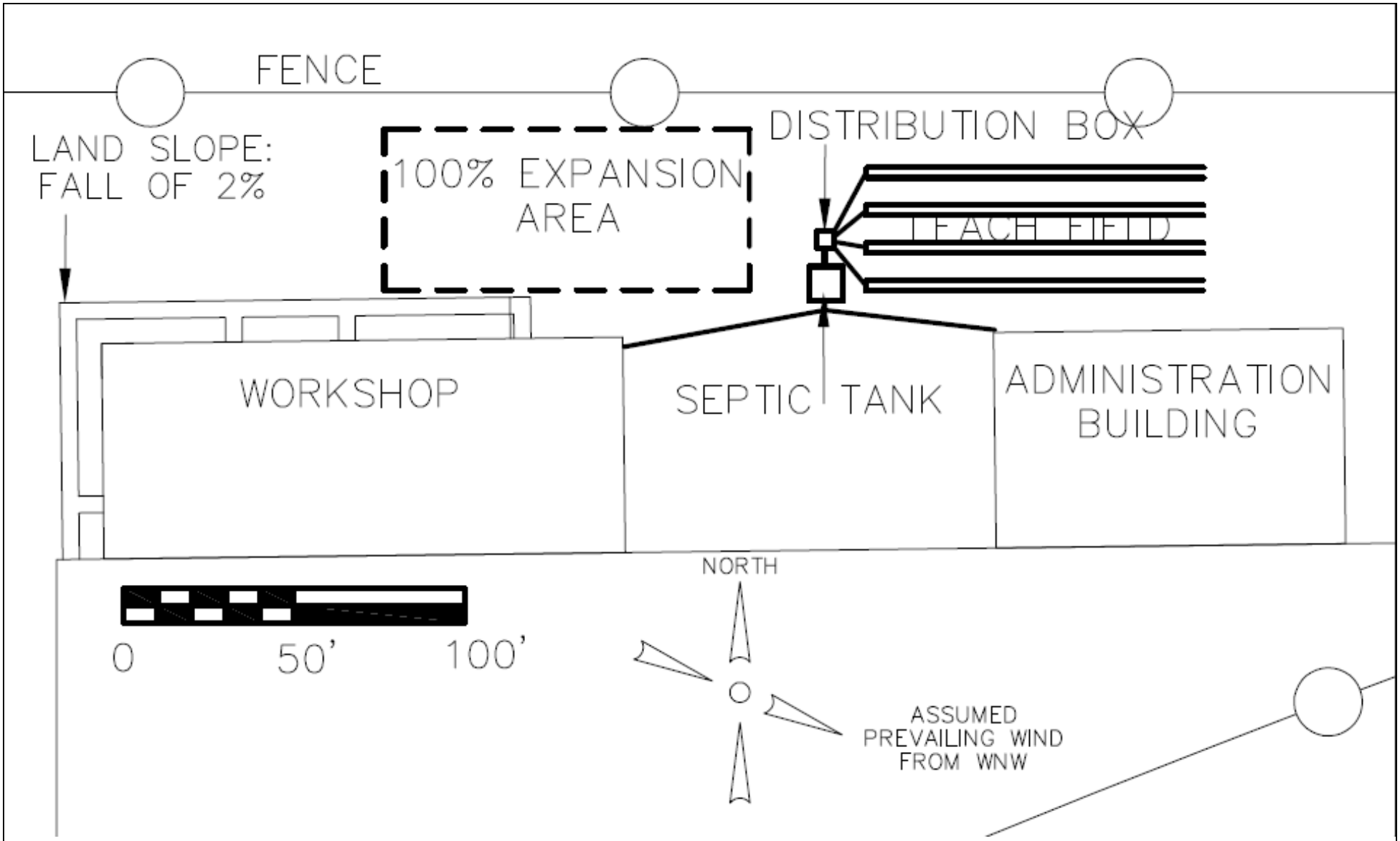
CLIENT/PROJECT TITLE

RICE SOLAR ENERGY, LLC
RICE SOLAR ENERGY PROJECT

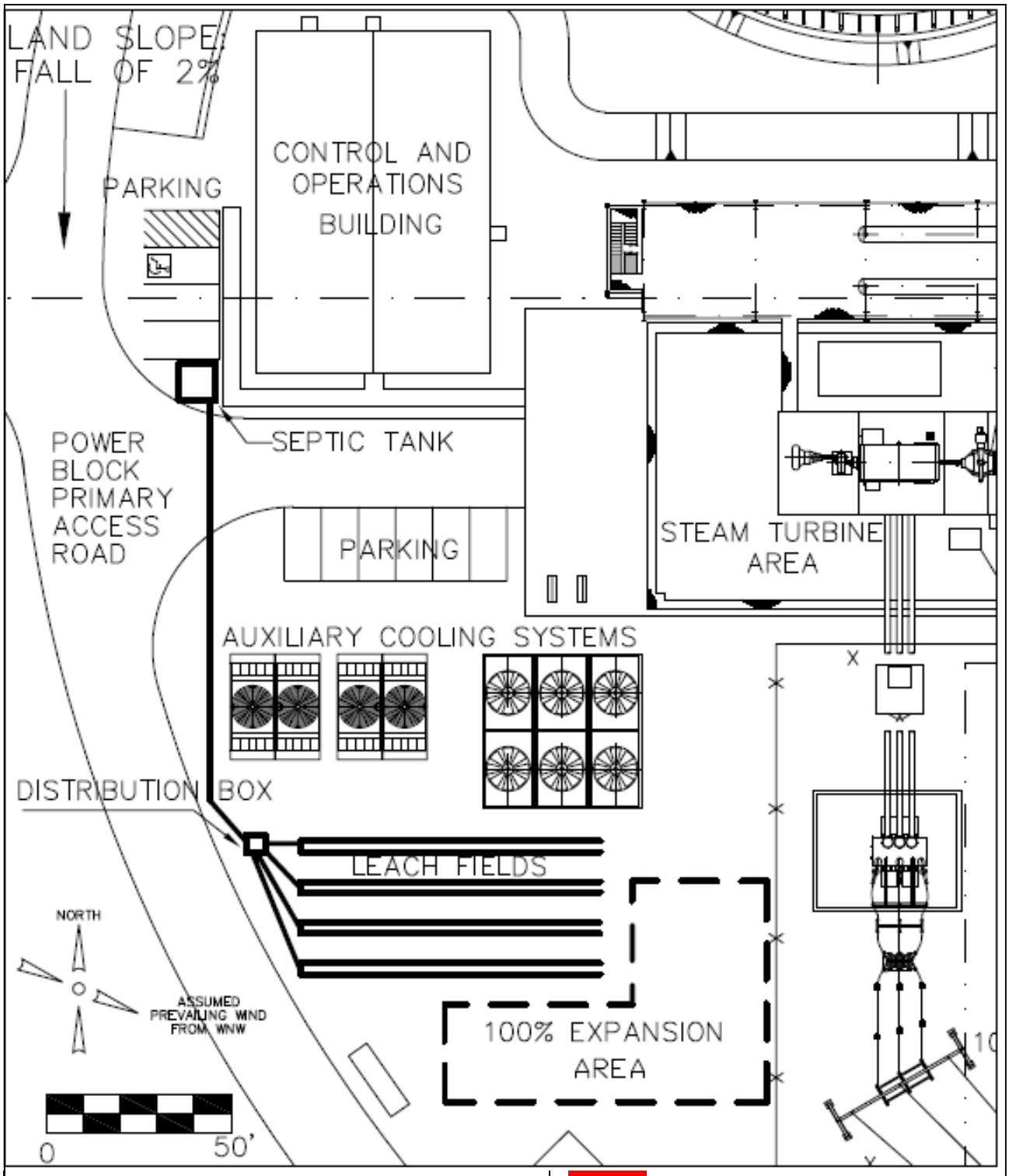
CONCEPTUAL GENERAL ARRANGEMENT SITE PLAN

SCALE 1"=1600' | DRAWING SIZE 11x17

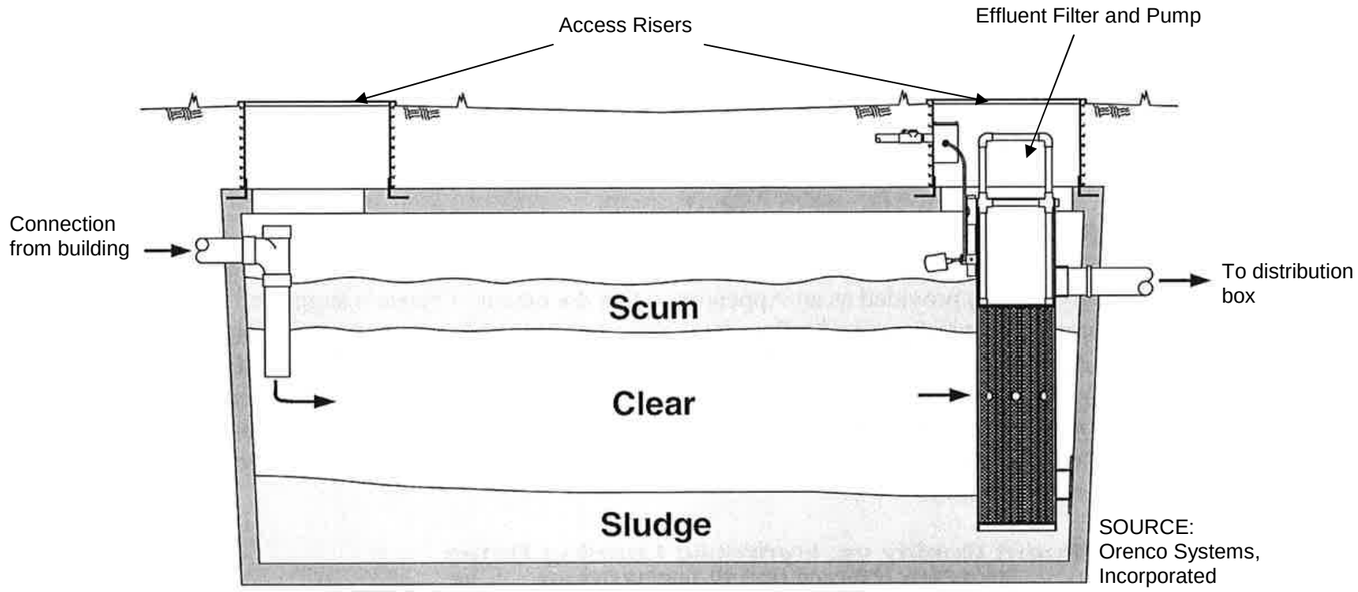
WORLEYPARSONS DWG. NO. FIGURE 2 | REV G



RICE SOLAR ENERGY LLC **RICE SOLAR ENERGY PROJECT**	WorleyParsons resources & energy		
SEPTIC SYSTEM A LAYOUT	03/2010	JF	**3**

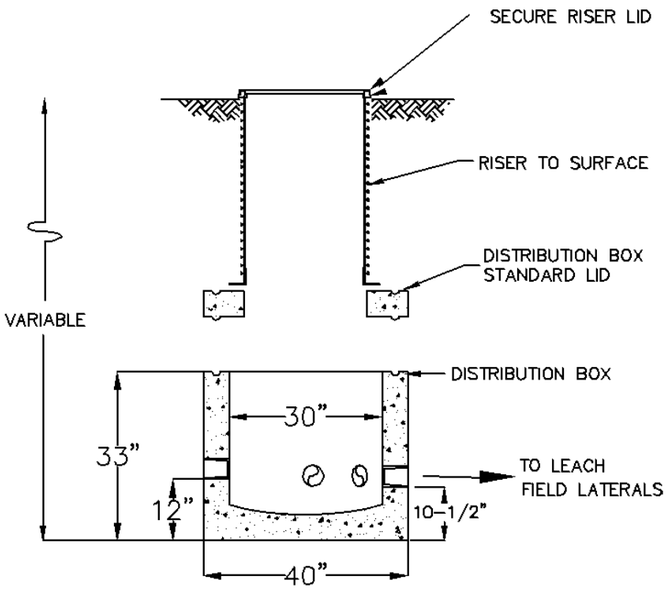


RICE SOLAR ENERGY LLC **RICE SOLAR ENERGY PROJECT**	**WorleyParsons** resources & energy		
SEPTIC SYSTEM B LAYOUT	03/2010	JF	**4**

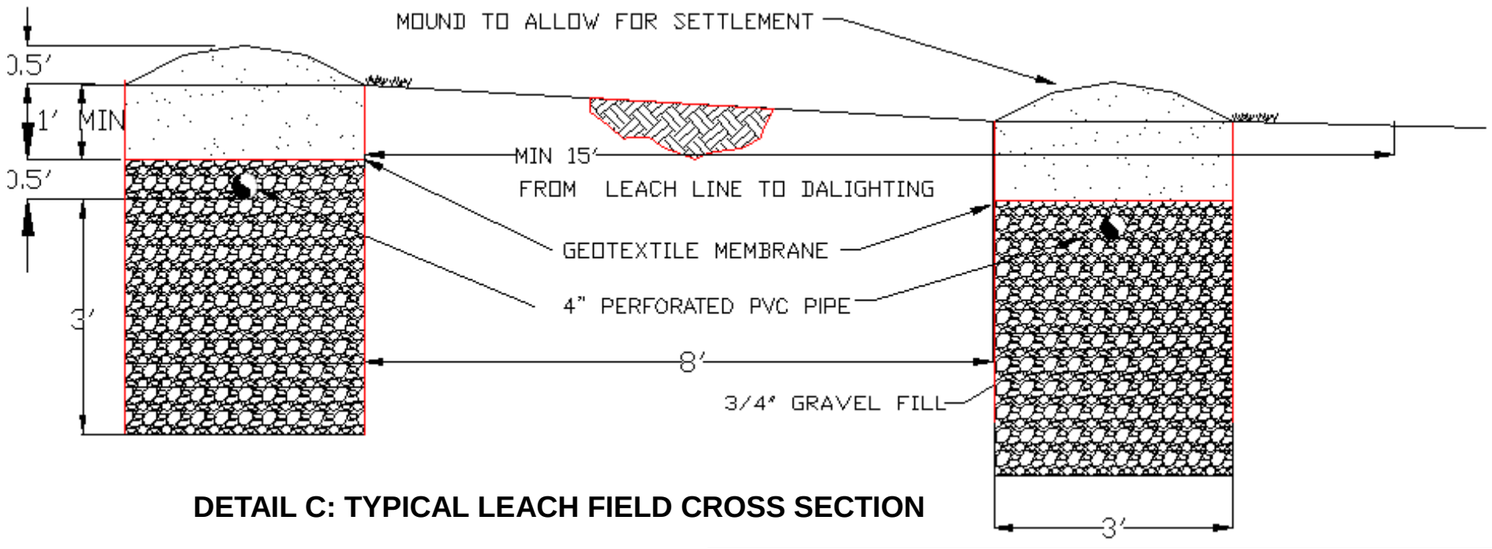


SOURCE: Orenco Systems, Incorporated

DETAIL A: TYPICAL SEPTIC TANK CROSS SECTION



DETAIL B: TYPICAL DISTRIBUTION BOX CROSS SECTION



DETAIL C: TYPICAL LEACH FIELD CROSS SECTION

RICE SOLAR ENERGY LLC RICE SOLAR ENERGY PROJECT	WorleyParsons resources & energy	
SEPTIC SYSTEM DETAILS	03/2010 | JF	**5**

ATTACHMENTS

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Attachment 1 - SEPTIC TANK SIZING

Conceptual Septic System Design and Layout
Rice Solar Energy Project

	Drainage Fixture Unit (Table 7-3 CUPC)	Septic System A					Septic System B	
		Workshop		Administration Building		Total Fixture Unit Value	Control & Operations Building	
		Number of Fixtures	Fixture Units	Number of Fixtures	Fixture Units		Number of Fixtures	Fixture Units
Shower Heads	2	-	-	3	6	6	3	6
Urinal	2	-	-	2	4	4	2	4
Toilets - Male	6	1	6	2	12	18	2	12
Toilets - Female	6	1	6	3	18	24	3	18
Bathroom Sinks	2	-	-	4	8	8	4	8
Industrial Sink	2	1	2	-	-	2	-	-
Kitchen Sink	2	-	-	1	2	2	1	2
Dishwashers	2	-	-	1	2	2	1	2
TOTAL			**14**		**52**	**66**		**52**

Septic Tank Capacity Calculation

Methodology: CUPC Table K-2

TABLE K-2
Capacity of Septic Tanks*

Single-Family Dwellings – Number of Bedrooms	Multiple Dwelling Units or Apartments – One Bedroom Each	Other Uses: Maximum Fixture Units Served per Table 7-3	Minimum Septic Tank Capacity in Gallons	(Liters)
1 or 2		15	750	(2,838)
3		20	1,000	(3,785)
4	2 units	25	1,200	(4,542)
5 or 6	3	33	1,500	(5,678)
	4	45	2,000	(7,570)
	5	55	2,250	(8,516)
	6	60	2,500	(9,463)
	7	70	2,750	(10,409)
	8	80	3,000	(11,355)
	9	90	3,250	(12,301)
	10	100	3,500	(13,248)

*Note:
Extra bedroom, 150 gallons (568 liters) each.
Extra dwelling units over 10,250 gallons (946 liters) each.
Extra fixture units over 100,25 gallons (95 liters) per fixture unit.
Septic tank sizes in this table include sludge storage capacity and the connection of domestic food waste disposal units without further volume increase.

Septic System	Number of Fixtures	Minimum Tank Size (gallons)
A	66	2,750
B	52	2,250

Methodology: CUPC Table K-3

(Excerpt of Table K-3)

TABLE K-3 (Continued)

Type of Occupancy	Gallons (liters) Per Day
10. Institutions (Resident)	75 (283.9) per person
Nursing home	125 (473.1) per person
Rest home	125 (473.1) per person
11. Laundries, self-service	
(minimum 10 hours per day)	50 (189.3) per wash cycle
Commercial	Per manufacturer's specifications
12. Motel	50 (189.3) per bed space
with kitchen	60 (227.1) per bed space
13. Offices	20 (75.7) per employee

Employee Estimations (Excerpt from the RSEP Application for Certification to the CEC, 2009, Section 2.2.14.2)

Typical Plant Operation & Maintenance Workforce

Department	Personnel	Shift*	Workdays
Operations	(20) Plant Operating Personnel (1) Plant Chemist	Standard 8-hour days, 4 operators per shift (5 crews of 4)	7 days per week, 24 hours per day
Heliostat Washing	(8) Heliostat Servicemen	Standard 8-hour days	5 days a week, with additional coverage as required by seasonal and other effects
Maintenance	(4) Mechanical Technicians (4) Electrical/I&C Technicians (4) Laborers (Semi-Skilled)	4x10 hour shifts or 5x8 hour shifts	Monday through Friday (Maintenance crews may also work unscheduled days and hours as needed to support plant outages)
Administration	(6) Total (1) Plant General Manager (1) Operations Superintendent (1) Plant Engineer (1) Maintenance Manager (1) Maintenance Planner (1) Administrative Assistant	4x10 hour shifts or 5x8 hour shifts	Monday through Friday with additional coverage as needed

Septic System	Applicable Departments	Employees	Flow (gallons per day)	Minimum Tank Size[1] (gallons)
A	Heliostat Washing, Maintenance, Administration	21	420	630
B	Operations	26	520	780

Note 1: For a flows under 1500 gallons per day, the calculation for septic tank size is:
Septic Tank size = Flow x 1.5

To meet both K-2 and K-3 requirements, the minimum septic tank capacity for Septic System A is 2,750 gallons and 2,250 gallons for Septic Tank B

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Attachment 2 - DISPOSAL FIELD SIZING

Conceptual Septic System Design and Layout
Rice Solar Energy Project

REQUIRED SIZE OF DISPOSAL FIELDS

A	2,750	Square Feet
B	2,250	Square Feet

The length of trench is dependant on depth of gravel below the perforated pipe
Excerpt: RDEH OTWS Installation Guide:

Table 5.8
Sidewall Calculation Allowances

Depth of Rock Below Leach Line	Square Foot of Bottom Area per Linear Foot of 3 Foot Wide Trench
1 foot of rock	3 Sq. Feet
2 foot of rock	5 Sq. Feet
3 foot of rock	7 Sq. Feet

To minimize leach field lengths, will have all trenchs 3 feet wide, and 3 foot of rock below the leach line
Design Criteria: All lines to be of equal length, with a maximum length of 100 feet

SEPTIC SYSTEM A

Length = $\frac{2,750}{7}$.= 392.9 feet of leach line is required

Layout of Leach Lines = 4 x 99 foot lines

SEPTIC SYSTEM B

Length = $\frac{2,250}{7}$.= 321.4 feet of leach line is required

Layout of Leach Lines= 4 x 81 foot lines

Per RDEH and CUPC guidelines, a second back up area is to be designated with the same capacity in case of future 100% expansion

Attachment WSQ11-1

Groundwater Monitoring Plan

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DATE	April 6, 2010
TO	John Kessler – California Energy Commission
FROM	Mike Tietze – WorleyParsons
COPY	Scott Kaminski – SolarReserve; Bob Anders – WorleyParsons; Scott Galati – Galati-Bleck; Doug Davy – CH2MHill; Andrea Grenier
PROJECT NAME	Rice Solar Energy Project
PROJECT NO.	52006721
SUBJECT	Groundwater Monitoring Program
FILE LOC	Folsom

MEMORANDUM

Pursuant to the Data Response and Issue Resolution Workshop for the Rice Solar Energy Project (the "Project") on March 19, 2010, on behalf of Rice Solar Energy LLC, WorleyParsons is pleased to present this memorandum summarizing the proposed Groundwater Monitoring Program to be implemented for the Project. Existing wells Rice #1 and Rice #2 are ideally situated and completed to assess pumping-induced affects to the Upper and Lower Alluvial Aquifers beneath the Project site. We propose to utilize these wells and compare observed impacts to those predicted by the groundwater model included in the Groundwater Resources Investigation prepared by WorleyParsons and dated October 9, 2009. If necessary, the model can then be updated to refine the understanding of anticipated drawdowns in the vicinity of the Project site. The proposed program is discussed in detail below.

Objectives

The objectives of the proposed Groundwater Monitoring Program are as follows:

- Establish baseline groundwater levels and trends in the Upper and Lower Alluvial Aquifers beneath the Project site;
- Document groundwater levels and trends in the Upper and Lower Alluvial Aquifers beneath the Project site after Project implementation;
- Evaluate groundwater level data to determine the magnitude of Project-induced drawdown in the Upper and Lower Alluvial Aquifers, compare measured to modeled drawdown, and validate or update groundwater drawdown predictions in off-site areas; and
- Issue periodic compliance reports presenting the findings and recommendations of the Groundwater Monitoring Program.

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Field Program

The groundwater monitoring field program will include the following tasks:

Pre-Construction Baseline Monitoring

- Modify on-site well Rice #2 by sealing the lower portion of the well that is completed in the Bouse formation with grout;
- Survey wellhead reference points at Rice #1 and Rice #2;
- Collect semi-annual (spring and fall) water level measurements from Rice #1 and Rice #2 using an electronic well sounder prior to construction; and
- Compile and issue a Baseline Groundwater Level Monitoring Report prior to beginning construction.

Construction Groundwater Monitoring

- Conduct quarterly groundwater level monitoring of Rice #1 and Rice #2 during the first year of construction and semi-annual monitoring thereafter;
    - Collect water level measurements using an electronic well sounder;
    - Collect water level measurement from Rice #2 after it has recovered from pumping for at least one day;
- Collect groundwater samples from Rice #2 during each monitoring event using a discharge port in the construction water supply line and analyze them for General Mineral content an indicator of overall water quality (including alkalinity, chloride, fluoride, nitrate, nitrite, pH, specific conductance, sulfate, total dissolved solids, total suspended solids and hardness); and
- Compile and issue Annual Groundwater Monitoring Reports during construction, including documentation of field methods and findings, evaluation of water level trends compared to expected results, validation or updating of modeled drawdown predictions, water quality trends, conclusions and recommendations.

Operational Groundwater Monitoring

- Conduct quarterly groundwater level monitoring of Rice #1 and Rice #2 during the first year of operation and semi-annual monitoring thereafter;
    - Collect water level measurements using an electronic well sounder;
    - Collect water level measurement from Rice #2 after it has recovered from pumping for at least one day;
- Collect groundwater samples from Rice #2 and the new water supply well for the Project during each monitoring event using discharge ports in the water supply lines and analyze them for General Mineral content;

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- Compile and issue Annual Groundwater Monitoring Reports including documentation of field methods and findings, evaluation of water level trends compared to expected results, validation or updating of modeled drawdown predictions, water quality trends, conclusions and recommendations; and
- Re-evaluate the scope of the groundwater monitoring program after five years of operation and amend the program as appropriate, including evaluation of the need for or potential reductions in the frequency of groundwater monitoring.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE *RICE SOLAR ENERGY POWER PLANT PROJECT*

Docket No. 09-AFC-10

PROOF OF SERVICE
(Revised 3/4/2010)

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DECLARATION OF SERVICE

I, Mary Finn, declare that on April 12, 2010 , I served and filed copies of the attached, Responses to CEC Staff Workshop Queries 4, 6-8 and 11. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/ricesolar].**

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

x ___ sent electronically to all email addresses on the Proof of Service list;

_____by personal delivery

_____by delivering on this date for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for the mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

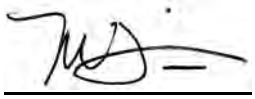
x_____ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

_____depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-10
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.



Mary Finn